

floor is concrete and the roof covering is tile, slate or asbestos shingles, the roof framing may be of wood without appreciable increase of fire hazard. If there is no means of communication between the upper rooms and garret, a wooden frame roof, and the top floor concrete ceiling constitute in reality two roofs, and the extra expense can be justified only because of architectural effect and some additional protection from heat and cold. The concrete ceiling may serve at the same time as a roof. This brings us to the question of the flat roof and its appearance. Much difference of opinion exists in regard to this matter. It is certainly true that many high-class residences have flat roofs. Both flat and pitched roofed houses were constructed in the Cranwood development, and the flat-roof houses were the first choice of the purchasers. A concrete pitched roof built with forms is more difficult to construct than a flat one. A concrete pitched roof can, however, be constructed by plastering or shooting with a cement-gun on expanded metal or mesh reinforcement.

Conclusions

1.—Concrete being a different material than other materials used in home building, presents new problems and new limitations in design. These must be studied in order to produce artistic effects economically.

2.—When houses are built in groups having the same overall dimensions, good architectural design can be given sufficient variety to remove appearance of sameness by using colors, by methods of surface finish and by skilful arrangement of roofs, balustrades, cornices, porches, etc. Irregularity of design, bay windows, curved surfaces, cornices or oblique angles are not necessary to good appearance of a large group of houses.

3.—The thickness of walls of monolithic houses is governed by considerations of field practice rather than by the requirement for strength. Building regulations should recognize the greater strength of concrete, and therefore the thickness of walls should be governed by the requirements of standard engineering practice. The exterior bearing walls built solid, the thickness in the basement need not exceed 8 ins., and in first and second stories, 6 ins. Where hollow wall construction is used, the same total thickness of concrete is sufficient. For exterior partitions, 4 ins. is recommended.

4.—Well constructed 6-in. concrete walls require little reinforcement for structural reasons, but do not need more than $\frac{1}{4}$ of 1% to provide for temperature stresses. A proper mix for these walls is about 1:2½:4, with maximum size aggregate about 1-in. Broken stone, pebbles or a good grade of slag or cinders may be used as coarse aggregate.

5.—In climates subject to sudden and great changes of temperature, a dead air space throughout the exterior walls must be included within the wall proper, or an air space must be formed by furring and plaster, or some insulating medium used between the solid wall and the interior finish.

6.—Complete firesafeness requires concrete floors and partitions and an incombustible roof.

7.—A concrete floor should preferably be covered by rugs, carpets, linoleum or special floor coverings that are easily removed.

8.—A thin stucco coat has been found a satisfactory method of finishing exterior surfaces. Finishes have also been obtained by exposing colored aggregates and by tooling, sand blasting or rubbing, in some cases with success. Trowelled finishes are not recommended.

9.—Small one-bag batch mixers and simple elevating equipment of the mast and bucket or two-legged tower and skip type are best adapted to monolithic house construction.

10.—Window and door frames can be set in the forms and the concrete cast around them. Wooden frames should be well primed as a protection from moisture in the concrete. Frames should be anchored to the concrete by means of long spikes or bolts. They should be braced against distortion from the pressure of the wet concrete.

11.—Forms should be light enough or in sufficiently small sections to allow handling by the form-setters without producing undue fatigue. They should be capable of positive alignment both vertically and horizontally.

12.—The monolithic house offers an unlimited field for development. Encouragement should be given to the development of all systems of forms for the construction of monolithic houses.

13.—The monolithic house offers advantages in speed of construction that makes it especially suitable for large housing developments.

SAYS EASTERN ONTARIO FAIRLY TREATED

REPLYING to complaints from Eastern Ontario regarding the number of roads in the eastern part of that province which were recently taken over by the provincial government as parts of the provincial highway, Hon. F. C. Biggs, Minister of Highways and Public Works in the Ontario cabinet, has issued a statement in which he declares that the eastern part of the province has been more than fairly treated. He says that whereas the assessment of the central district of the province is 55% of the total assessment of the province, and the assessed population is 49% of the total, only 35% of the provincial highway system is in the central district. In the western district there is 25% of the total assessment of the province and 26% of the population, with 31% of the provincial highway system. On the other hand, although 34% of the provincial highway system is in the eastern district, the assessment of that district is only 20% of the total and the population 25%, says Mr. Biggs. He refers to the western district as comprising all of Ontario west of a line drawn southerly from the Georgian Bay to Lake Erie, the central district as the remaining portion of the province as far east as Lindsay, and the eastern district as the portion east of Lindsay.

E. A. Cleveland, of Victoria, and Donald Cameron, of Northern Vancouver, well-known consulting engineers, are suing the Pemberton Drainage Commission to recover money which they claim to be due for their services as consulting engineers.

By a majority of only two votes, the railway committee of the House of Commons refused last week to grant a charter to the Pabos & Edmundston Railway Co. to construct a 240-mile railway in the Gaspé peninsula. The Minister of Railways stated that the day of federal subsidies for railways had gone.

According to a newspaper despatch from Quebec City, more bridges will be built by the Department of Public Works of that province this season than were built in any previous year. Among the larger bridges under construction are the Batiscan and the Metabetchouan. In the Gaspé region a considerable number of new bridges will be built to encourage colonization.

Scientific research in government laboratories has considerable advantage over similar research conducted privately for competitive purposes, declared Dr. G. K. Burgess, chief of the Division of Metallurgy, Bureau of Standards, Washington, D.C., in lecturing last week before the Royal Canadian Institute, Toronto. Dr. Burgess claimed that the conditions under which research is conducted in the Bureau of Standards is admirably suited to the requirements of investigators.

A. Brooks, representing Sir John Jackson Co., Ltd., of London, Eng., visited Edmonton recently en route to Victoria, where his company has a contract for the construction of docks. While in Edmonton Mr. Brooks stated that his company fully intends to proceed with the construction of a railway from Edmonton to their hydro-electric power development on the Saskatchewan River, and to spend \$400,000 on additional power development. Mr. Brooks expressed regret that conditions due to the war had interfered with this work, and said that he did not know precisely when the construction would be started, but he assured Edmonton interests that the work would be completed as soon as financial circumstances permit.